

AMENDMENTS TO THE CLAIMS:

Kindly amend claims 14-16, and add new claims 17-27, as shown below.

This listing of claims will replace all prior versions and listings of claims in the Application:

Claim 1 (original): A single-chip microcomputer comprising:

a non-volatile memory having a plurality of memory block pairs as a combination of a plurality of memory blocks each formed of a user region for storing a program code by a user and a region for storing a boot area designation flag indicating that a boot program to be executed first at the time of system booting is stored in said user region, in which the boot program is stored in a user region of a memory block of a specific pair of memory blocks at an initial state where no boot region switching processing is conducted,

a region switching flag for indicating in which memory block pair the boot program is stored in the user region among said plurality of pairs of memory blocks, and

a control element for, when designating other pair of memory blocks not designated as a boot region as a new boot region, storing a value obtained by subtracting a predetermined value from an initial value set at said boot area designation flag of the memory block of all said memory block pairs in the boot area designation flag of each memory block of said other memory block pair and at the time of booting the system, if the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, determining that the boot program is stored in said other memory block pair to set said region switching flag.

Claim 2 (original): The single-chip microcomputer as set forth in claim 1, wherein

said control element,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are different or the initial value, determines that the boot area designation flag in question is invalid to determine that the boot program is stored in the user region of the memory block of said specific memory block pair.

Claim 3 (original): The single-chip microcomputer as set forth in claim 1, wherein

said control element,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value,

if values of the boot area designation flags in the memory blocks of said specific memory block pair are different, determines that the boot area designation flag in the memory block of said specific memory block pair is invalid to determine that the boot program is stored in said other memory block pair.

Claim 4 (original): The single-chip microcomputer as set forth in claim 1, wherein

said control element,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if values of the boot area designation flags in the memory blocks of said specific memory block pair are equal, determines that the boot program is stored in a memory block of a memory block pair which stores a boot area designation flag whose value is smaller.

Claim 5 (original): The single-chip microcomputer as set forth in claim 1, wherein

said control element,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value or "0", determines that the boot program is stored in said other memory block pair.

Claim 6 (original): The single-chip microcomputer as set forth in claim 1, wherein

at the time of erasure, each memory block of said memory block pairs of said non-volatile memory has said user region and said boot area designation flag erased simultaneously.

Claim 7 (original): A single-chip microcomputer comprising:

a non-volatile memory having a plurality of memory block pairs as a combination of a plurality of memory blocks each formed of a user region for storing a program code by a user and a region for storing a boot area designation flag indicating that a boot program to be executed first at the time of system booting is stored in said user region, in which the boot program is stored in a user region of a memory block of a specific memory block pair at an initial state where no boot region switching processing is conducted,

a region switching flag for indicating in which memory block pair the boot program is stored in the user region among said plurality of pairs of memory blocks, and

a control element for setting said region switching flag, wherein
said control element

when designating other memory block pair not designated as a boot region as a new boot region, stores a value obtained by subtracting a predetermined value from an initial value set at said boot area designation flag of the memory block of all said memory block pairs in the boot area designation flag of each memory block of said other memory block pair and at the time of booting the system, if the values of the boot area designation flags in the memory blocks of said

other memory block pair are equal and not the initial value, determines that the boot program is stored in said other memory block pair,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are different or the initial value, determines that the boot area designation flag in question is invalid to determine that the boot program is stored in the user region of the memory block of said specific memory block pair,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if values of the boot area designation flags in the memory blocks of said specific memory block pair are different, determines that the boot area designation flag in the memory block of said specific memory block pair is invalid to determine that the boot program is stored in said other memory block pair, and

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if the values of the boot area designation flags in the memory blocks of said specific memory block pair are equal, determines that the boot program is stored in a memory block of a memory block pair which stores a boot area designation flag whose value is smaller.

Claim 8 (original): In a single-chip microcomputer including a non-volatile memory having a plurality of memory block pairs as a combination of a plurality of memory blocks each formed of a user region for storing a program code by a user and a region for storing a boot area designation flag indicating that a boot program to be executed first at the time of system booting is stored in said user region, in which the boot program is stored in a user region of a memory block of a specific pair of memory blocks at an initial state where no boot region switching processing is conducted, and a CPU, a boot region designating method of the single-

chip microcomputer of, when a user region of a memory block of a specific memory block pair is designated as a boot region in which the boot program is stored, switching a region of other memory block pair as a new boot region, comprising the steps of:

when designating other memory block pair not designated as a boot region as a new boot region, storing a value obtained by subtracting a predetermined value from an initial value set at said boot area designation flag of the memory block of all said memory block pairs in the boot area designation flag of each memory block of said other memory block pair, and

at the time of booting the system, if the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, determining that the boot program is stored in said other memory block pair.

Claim 9 (original): The boot region designating method of the single-chip microcomputer as set forth in claim 8, comprising the step of,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are different or the initial value, determining that the boot area designation flag in question is invalid to determine that the boot program is stored in the user region of the memory block of said specific memory block pair.

Claim 10 (original): The boot region designating method of the single-chip microcomputer as set forth in claim 8, comprising the step of,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if values of the boot area designation flags in the memory blocks of said specific memory block pair are different, determining that the boot area designation flag in the memory block of said specific memory block pair is invalid to determine that the boot program is stored in said other memory block pair.

Claim 11 (original): The boot region designating method of the single-chip microcomputer as set forth in claim 8, comprising the step of,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if values of the boot area designation flags in the memory blocks of said specific memory block pair are equal, determining that the boot program is stored in a memory block of a memory block pair which stores a boot area designation flag whose value is smaller.

Claim 12 (original): The boot region designating method of the single-chip microcomputer as set forth in claim 8, comprising the step of,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value or "0", determining that the boot program is stored in said other memory block pair.

Claim 13 (original): In a single-chip microcomputer including a non-volatile memory having a plurality of memory block pairs as a combination of a plurality of memory blocks each formed of a user region for storing a program code by a user and a region for storing a boot area designation flag indicating that a boot program to be executed first at the time of system booting is stored in said user region, in which the boot program is stored in a user region of a memory block of a specific pair of memory blocks at an initial state where no boot region switching processing is conducted, and a CPU, a boot region designating method of the single-chip microcomputer of, when a user region of a memory block of a specific memory block pair is designated as a boot region in which the boot program is stored, switching a region of other memory block pair as a new boot region, comprising the steps of:

when designating other memory block pair not designated as a boot region as a new boot region, storing a value obtained by subtracting a predetermined value from an initial value set at said boot area designation flag of the memory block of all said memory block pairs in the boot area designation flag of each memory block of said other memory block pair,

at the time of booting the system, if the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, determining that the boot program is stored in said other memory block pair,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are different or the initial value, determining that the boot area designation flag in question is invalid to determine that the boot program is stored in the user region of the memory block of said specific memory block pair,

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if values of the boot area designation flags in the memory blocks of said specific memory block pair are different, determining that the boot area designation flag in the memory block of said specific memory block pair is invalid to determine that the boot program is stored in said other memory block pair, and

when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value, if values of the boot area designation flags in the memory blocks of said specific memory block pair are equal, determining that the boot program is stored in a memory block of a memory block pair which stores a boot area designation flag whose value is smaller.

Claim 14 (currently amended): A boot region switching method of a microcomputer that has ~~including~~ a non-volatile memory, said nonvolatile memory having a first memory block and a

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567

second memory block, and each of said first and second memory blocks being formed of a program region and a boot area designation flag region, of the microcomputer, said method comprising the steps of:

when storing a new boot program in said non-volatile memory instead of said an original boot program, program by:

erasing data [[of]] in said second memory block,

storing said new boot program in said program region of said second memory block,

storing data, ~~which are~~ different from data stored in said boot area designation flag region of said first memory block, in said boot area designation flag region of said second memory block, and

erasing data [[of]] in said first memory block.

Claim 15 (currently amended): A boot region switching method of a microcomputer as set forth in claim 14, wherein

when reading said boot program, program is read by:

reading said boot area designation flag from each of said first memory block and said second memory block,

executing said boot program stored in said first memory block or said new boot program stored in said second memory block based on a comparison result of said boot area designation flag from said first memory block and said boot area designation flag from said second memory block.

Claim 16 (currently amended): ~~A boot region switching method of a microcomputer as set forth in claim 14, wherein~~ A boot region switching method of a microcomputer that has a non-

volatile memory, said nonvolatile memory having a first memory block and a second memory block, and each of said first and second memory blocks being formed of a program region and a boot area designation flag region, wherein

said boot area designation flag region of said second memory block ~~including~~ includes a first boot area designation flag region and a second boot area designation flag region,

~~instead of said step of storing data which are different from data stored in said boot area designation flag region of said first memory block in said boot area designation flag region of said second memory block,~~

said method comprising the steps of:

when storing a new boot program in said non-volatile memory instead of an original boot program by:

erasing data in said second memory block,

storing said new boot program in said program region of said second memory block,

storing data which are different from data stored in said boot area designation flag region of said first memory block in said first boot area designation flag region of said second memory block,

storing same data as data of said boot area designation flag region of said first memory block in said second boot area designation flag region of said second memory block.

Claim 17 (new): A single-chip microcomputer comprising:

a non-volatile memory having a plurality of memory block pairs, each memory block pair formed of a plurality of memory blocks, and each memory block having a user region for storing a program code by a user and a boot area designation flag indicating that a boot

program to be executed when a system boot is stored in said user region, said boot program is stored in a user region of a memory block of a specific pair of memory blocks at an initial state, a region switching flag indicating which of said memory block pair stores said boot program, and

a control element for, when designating another pair of memory blocks not designated as the specific memory block pair initially storing said boot program as a new pair of memory blocks to store the boot program, storing a value, obtained by subtracting a predetermined value from an initial value of said boot area designation flags of the memory blocks in all of memory block pairs, in the boot area designation flags of each memory block of said another memory block pair, wherein when booting the system, if the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value, determining that the boot program is stored in said another memory block pair and setting said region switching flag.

Claim 18 (new): The single-chip microcomputer as set forth in claim 17, wherein

when the values of the boot area designation flags in the memory blocks of said another memory block pair are different or the initial value, said control element determines that the boot area designation flag is invalid and determines that the boot program is stored in the user region of the memory block of said specific memory block pair.

Claim 19 (new): The single-chip microcomputer as set forth in claim 17, wherein

when the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value, and if values of the boot area designation flags in the memory blocks of said specific memory block pair are different, said control element determines that the boot area designation flag in the memory block of said specific

memory block pair is invalid, and determines that the boot program is stored in said another memory block pair.

Claim 20 (new): The single-chip microcomputer as set forth in claim 17, wherein

when the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value, and if values of the boot area designation flags in the memory blocks of said specific memory block pair are equal, said control element determines that the boot program is stored in a memory block of either one of a memory block pair that stores a smaller value for said boot area designation flag.

Claim 21 (new): The single-chip microcomputer as set forth in claim 17, wherein

when the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value or "0", said control element determines that the boot program is stored in said another memory block pair.

Claim 22 (new): The single-chip microcomputer as set forth in claim 17, wherein

at the time of erasure, each memory block of said memory block pairs of said non-volatile memory has said user region and said boot area designation flag erased simultaneously.

Claim 23 (new): In a single-chip microcomputer including: a non-volatile memory having a plurality of memory block pairs, said memory block pairs having a plurality of memory blocks, said memory blocks each formed of a user region for storing a program code by a user and a boot area designation flag indicating that a boot program to be executed at system booting is stored in said user region, wherein the boot program is stored in a user region of a specific memory block of a specific pair of memory blocks at an initial state; and a CPU, a boot region designating method of the single-chip microcomputer for switching between a user region of a memory block of said specific memory block pair designated as a boot region in which the boot

program is stored and a user region of another memory block pair, comprising the steps of:

storing a value, obtained by subtracting a predetermined value from an initial value set at said boot area designation flag of the memory block of all of said memory block pairs, in the boot area designation flag of each memory block of said another memory block pair, when designating other memory block pair not designated as a boot region as a new boot region, and

determining that the boot program is stored in said other memory block pair, if the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value, when the system initially boots.

Claim 24 (new): The boot region designating method of the single-chip microcomputer as set forth in claim 23, further comprising the step of,

determining that the boot area designation flag in question is invalid, when the values of the boot area designation flags in the memory blocks of said another memory block pair are different or the initial value, so as to determine that the boot program is stored in the user region of the memory block of said specific memory block pair.

Claim 25 (new): The boot region designating method of the single-chip microcomputer as set forth in claim 23, comprising the step of,

determining that the boot area designation flag in the memory block of said specific memory block pair is invalid when the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value, and if values of the boot area designation flags in the memory blocks of said specific memory block pair are different, so as to determine that the boot program is stored in said another memory block pair.

Claim 26 (new): The boot region designating method of the single-chip microcomputer as set forth in claim 23, comprising the step of,

determining that the boot program is stored in a memory block of a memory block pair which stores a smaller value in said boot area designation flag, when the values of the boot area designation flags in the memory blocks of said another memory block pair are equal and not the initial value, and if values of the boot area designation flags in the memory blocks of said specific memory block pair are equal.

Claim 27 (new): The boot region designating method of the single-chip microcomputer as set forth in claim 23, comprising the step of,

determining that the boot program is stored in said another memory block pair, when the values of the boot area designation flags in the memory blocks of said other memory block pair are equal and not the initial value or "0".

HAYES SOLOWAY P.C.
3450 E. SUNRISE DRIVE
SUITE 140
TUCSON, AZ 85718
TEL. 520.882.7623
FAX. 520.882.7643

175 CANAL STREET
MANCHESTER, NH 03101
TEL. 603.668.1400
FAX. 603.668.8567